OBJECTIVE, PROCEDURE-SPECIFIC ASSESSMENT OF MINIMALLY INVASIVE INGUINAL HERNIA REPAIR FOUND ON YOUTUBE TO ASSESS PROCEDURAL SAFETY AS A DISCRIMINATOR FOR POSTING

Vahagn C. Nikolian, MD[1], Diego R. Camacho, MD, FACS[2], David B. Earle, MD, FACS[3], Ryan K. Lehmann, DO, FACS, FASMBS[4], Peter N. Nau, MD, MS, FACS[5], Bruce J. Ramshaw, MD, FACS[6,7], Jonah J. Stulberg, MD, PhD, MPH, FACS[8], Michael S. Woods, MD, MMM[7]

[1]Oregon Health & Science University, Department of Surgery, Portland, Oregon, USA; [2]Minimally Invasive and Endoscopic Surgery at Montefiore Medical Center, New York, New York, USA; [3]New England Hernia Center, Lowell, Massachusetts, USA; [4]Tufts University School of Medicine, Boston, Massachusetts, USA; [5]Department of Surgery, Section of Bariatric Surgery, University of Iowa Hospitals & Clinics, Iowa City, Iowa, USA; [6]CQInsights PBC, Knoxville, Tennessee, USA; [7]Caresyntax Corporation, Boston, Massachusetts, USA; [8]Department of Surgery, McGovern Medical School University of Texas Health Science Center at Houston, Houston, Texas, USA

BACKGROUND

- Surgical videos posted on YouTube are a common source of surgical education.[1]
- However, surgical videos posted on YouTube are subject to variable quality and technical skills, raising concerns about suitability for training.[2]
- Performance evaluation of surgical videos has previously relied on global skills assessments such as the Global Operative Assessment of Laparoscopic Skills (GOALS) or Global Evaluation of Robotic Skills (GEARS).
- As global assessments of surgical technique are limited in their ability to document the safe completion of individual procedural tasks, an objective, procedure-specific assessment for inguinal hernia repair (IHR-OPSA) was previously developed and validated.[3]

OBJECTIVES

- Using the IHR-OPSA, assess the quality of minimally invasive IHR (MI-IHR) procedures posted on YouTube as a qualifier for use in training.

METHODS

Surgeon Reviewers and Video Selection

- Cross-sectional evaluation of a convenience sample of 13 IHR surgical videos by six board-certified surgeons (mean practice duration: 16.3 years) experienced in MI-IHR.
- Video identification and selection:
  - Videos were identified using simple search terms on Google.
  - Inclusion criterion: Videos of laparoscopic or robotic IHR surgery with minimal or no editing.
  - Exclusion criterion: Videos that could not be de-identified.

Data Collection

- 13 eligible de-identified videos were uploaded to a proprietary SaaS-based software platform for video-based assessment (VBA).
- Data on each video were recorded in a spreadsheet and submitted for analysis.

Instruments

- The 8-item IHR-OPSA includes 7 task-specific assessments (port placement, elevation of peritoneal flap, exposure; reducing the sac, dissection of myopectineal orifice, mesh insertion, and mesh fixation) and one assessment of operation flow, each measured on a 3-point scale (Table 1).
- In addition to IHR-OPSA, each surgeon: a) completed the Global Assessment of Surgical Skills (GASS)[4] an overall assessment of surgical skill on a 3-point scale (1 = poor, 2 = adequate, 3 = good), b) assigned a Global Case Difficulty (GCD) score (1 - easy; 2 - average; 3 - hard), and c) completed the 5-point GEARS (for robotic procedures) or 5-point GOALS (for laparoscopic procedures).

Analysis

- The following were calculated for each video:
  - Mean scores for the IHR-OPSA, GCD, GASS, GEARS, and GOALS.
  - The number of tasks rated as "unsafe" (score = 1) by at least one surgeon rater.
- Total Agreement. Ratio of raters that agreed on case safety based upon each IHR-OPSA task, with scores categorized as unsafe (1) or safe (score = 2 or 3).

Table 1. The IHR-OPSA instrument

ITEM	SCALE	
1. Incision/Port placement	1.	Poor (Unsafe – Position or insertion or removal technique)
	2.	Adequate (Safe – Functional position [even if awkward] or some port insertion difficulty, but generally safe)
	3.	Excellent (Expert-level performance – safe, efficient and optimal port position for procedure and anatomy)
2a. Elevation of Peritoneal Flap (TAPP)*	1.	Poor (Unsafe – Poor technique and/or excessive bleeding or trauma to flap)
	2.	Adequate (Safe – Satisfactory technique but made closure more difficult than necessary)
	3.	Excellent (Expert-level performance – Excellent technique and minimal bleeding with an intact flap for easy closure)
2b. Elevation of Peritoneal Flap (TEP)*	1.	Poor (Unsafe – Difficult entrance into pre-peritoneal cavity or difficulty with balloon insertion and inflation)
	2.	Adequate (Safe – Moderate efficiency in balloon insertion and inflation)
	3.	Excellent (Expert-level performance – Avoidance of peritoneal injury, careful insertion of balloon and inflation)
3. Exposure	1.	Poor (Unsafe – Poor or inadequate pneumoperitoneum, or camera angel, or retraction with frequent loss of exposure)
	2.	Adequate (Safe – Adequate establishment and maintenance of pneumoperitoneum camera angle and retraction with occasional loss of exposure)
	3.	Excellent (Expert-level performance – Optimizes exposure, efficiently directs retraction and camera while maintaining exposure and pneumoperitoneum)
4. Reducing the sac	1.	Poor (Unsafe – Poor technique requiring greater than expected time)
	2.	Adequate (Safe – Moderate efficiency in reducing the sac)
	3.	Excellent (Expert-level performance – Careful and efficient reduction of the sac)
5. Full dissection of the myopectineal orifice	1.	Poor (Unsafe – Poor technique – inadequate exposure of the myopectineal orifice)
	2.	Adequate (Safe – Moderate efficiency in dissection exposing the full myopectineal orifice)
	3.	Excellent (Expert-level performance – Careful, efficient, and full exposure in the dissection of the myopectineal orifice)
6. Mesh insertion	1.	Poor (Unsafe – Excessive time for mesh insertion or poor placement)
	2.	Adequate (Safe – Moderately efficient mesh insertion and acceptable placement)
	3.	Excellent (Expert-level performance – Efficient and accurate placement)
7. Mesh fixation	1.	Poor (Unsafe – Poor technique or fixation technique)
	2.	Adequate (Safe – Acceptable fixation technique)
	3.	Excellent (Expert-level performance – Ideal fixation technique)
8. Operation flow	1.	Poor (Unsafe – Frequent lack of forward progression or frequently stopped operating or seemed unsure of next move)
	2.	Adequate (Safe – Some forward planning and reasonable procedure progression)
	3.	Excellent (Expert-level performance – Obvious planned course of operation and anticipation of next steps)

*Items 2a and 2b are mutually exclusive that were assessed for transabdominal preperitoneal (TAPP) or totally extraperitoneal (TEP) techniques, respectively.

RESULTS

- All 6 surgeons completed assessments of the 13 videos: 5 robotic-assisted procedures; 8 laparoscopic procedures.
- IHR-OPSA Total Agreement: 97.4%.
- All tasks of the robotic procedures were performed safely with a mean IHR-OPSA score of 2.7.
- Three of the 8 laparoscopic surgeries had one or more unsafe task ratings with a mean IHR-OPSA score of 2.3.
- GASS & GOALS global skill score means were ≥2.4 (good to excellent) and ≥4.4 (very good to excellent), respectively, for the 3 cases having ≥1 unsafe task documented using the IHR-OPSA.

Table 2. Results from Evaluation of the 13 Surgical Videos.

Video No.	GCD (mean)	OPSA Score (mean)	≥ 1 unsafe rating	GASS Score (mean)	GEARS Score (mean)	GOALS Score (mean)
1	2.0	2.6	No	2.7	4.0	
2	2.0	2.6	No	2.7		4.5
3	2.7	2.8	No	2.8	4.1	
4	1.5	2.7	No	2.7	4.2	
5	1.7	2.8	No	2.7	4.1	
6	2.5	2.6	No	2.8		4.7
7	1.5	2.7	No	2.6		4.6
8	1.7	2.7	No	2.7		4.8
9	2.3	2.6	No	2.4		4.5
10	2.0	2.8	No	2.7	4.3	
11	1.5	2.6	Yes	2.6		4.8
12	2.0	2.3	Yes	2.4		4.5
13	1.9	1.9	Yes	2.1		4.1
Summary	**1.9**	**2.6**	**3/13**	**2.6**	**4.2**	**4.6**

CONCLUSIONS

- Three of the eight (23%) laparoscopic IHR repairs had ≥1 procedural task rated as unsafe.
- The global ratings of surgical skills as measured by the GOALS were high (≥4.1) for the three procedures with at least one task rated unsafe.
- To support high-quality training, use of OPSA instruments may more reliably determine the appropriateness of MI IHR videos than assessments of global surgical skill.

REFERENCES

1.Rapp, A. K., Healy, M. G., Charlton, M. E., Keith, J. N., Rosenbaum, M. E., & Kapadia, M. R. (2016). YouTube is the most frequently used educational video source for surgical preparation. *Journal of surgical education*, *73*(6), 1072-1076.
2.Farag, M., Bolton, D., & Lawrentschuk, N. (2020). Use of YouTube as a resource for surgical education—clarity or confusion. *European urology focus*, *6*(3), 445-449.
3.Nikolian, V. C., Camacho, D., Earle, D., Lehmann, R., Nau, P., Ramshaw, B., & Stulberg, J. (2024). Development and preliminary validation of a new task-based objective procedure-specific assessment of inguinal hernia repair procedural safety. *Surgical endoscopy*, 1-9.
4.Nau, P., Worden, E., Lehmann, R., Kleppe, K., Mancini, G. J., Mancini, M. L., & Ramshaw, B. (2023). Global assessment of surgical skills (GASS): validation of a new instrument to measure global technical safety in surgical procedures. *Surgical Endoscopy*, *37*(10), 7964-7969.

DISCLOSURES

Study funded by: Caresyntax Corporation.